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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/408,149	09/29/1999	BHIMSEN BHANJOIS	07575/034001	3652

26181 7590 04/15/2005

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EXAMINER	
ALI, SYED J	

ART UNIT	PAPER NUMBER
2195	

DATE MAILED: 04/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/408,149	BHANJOIS ET AL.	
	Examiner	Art Unit	
	Syed J Ali	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-11,14-21,24-31 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-11,14-21,24-31 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's arguments in the appeal brief filed February 14, 2005, with respect to the rejections of claims 1-4, 14-21, 24-21, and 33 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new grounds of rejection is made in view of Yodaiken (USPN 5,995,745) and Beckhoff (USPN 6,167,425).

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1, 4-10, 21, and 24-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

5. As per claim 1, the claimed "operating system" is non-statutory as not being tangibly embodied in a manner as to be executable. The operating system is contained entirely within software. Claims 4-10 are rejected for at least the same reasons as discussed for their parent claim, as they fail to present any limitations that resolve the deficiencies of the claim from which they depend.

6. As per claim 21, the claimed "system" is non-statutory as not being tangibly embodied in a manner as to be executable. The system may be embodied wholly within software. Claims 24-30 are rejected for at least the same reasons as discussed for their parent claim, as they fail to present any limitations that resolve the deficiencies of the claim from which they depend.

Claim Rejections - 35 USC § 103

7. **Claims 1, 4-5, 9-11, 14-15, 19-21, 24-25, and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yodaiken in view of Beckhoff.**

8. As per claim 1, Yodaiken teaches the invention as claimed, including an operating system, comprising:

a non-preemptive microkernel executing two or more processes in accordance with a non-preemptive scheduling scheme (col. 4 line 49 - col. 5 line 2); and

one or more kernels each being executed as a process by the non-preemptive microkernel (col. 2 lines 6-16),

wherein at least one of the one or more kernels executes an operating system as a dependent process (col. 2 lines 6-16), the operating system being a time-sliced operating system or a time-sliced microkernel (col. 4 lines 55-63).

9. Yodaiken fails to teach each process executed by a non-preemptive microkernel only being interrupted for a higher priority process to execute when the process blocks or explicitly

requests to be preempted. Beckhoff teaches this limitation (col. 3 lines 1-4; col. 3 lines 25-48; col. 4 lines 50-52).

10. Yodaiken teaches a real-time operating system that runs a plurality of real-time tasks, including at least one general purpose operating system. The real-time tasks are executed in a non-preemptive manner, i.e. they run until completion and preempt the general purpose operating system (col. 4 lines 49-55). The microkernel actually supports both non-preemptive (a task yields the processor voluntarily) and preemptive (preempting as needed) modes of operation. The preemptive mode of operation applies to the general purpose operating system, which is preempted when a high priority real time task becomes runnable (col. 2 lines 53-54; col. 4 lines 49-55).

Beckhoff, also seeking to provide real-time control for a general purpose operating system, addresses the problems with preempting an operating system, including time critical tasks being unable to meet deadlines or tasks leaving a shared resource in an inconsistent state (col. 1 lines 41-47; col. 2 lines 25-30). To remedy this problem, Beckhoff teaches disabling interrupts (col. 2 lines 25-30) such that the operating system executes for a minimum amount of time to allow completion of any critical processing (col. 3 lines 1-4; col. 3 lines 25-48). The general purpose operating system gives up the processor voluntarily at the end of its allocated time, or if an interrupt is received, it finishes any critical processing before allowing interruption.

Therefore, it would have been obvious to one of ordinary skill in the art to combine Yodaiken and Beckhoff since they are both concerned with the problem of providing real-time support to operating systems that do not readily support real-time. The combination thereof

allows real-time support to be included with a non real-time operating system, while ensuring that the problems associated with interrupting an operating system prematurely are avoided.

11. As per claim 4, Yodaiken teaches the invention as claimed, including the operating system of claim 1, wherein the operating system is Unix (col. 3 lines 37-42).

12. As per claim 5, Yodaiken teaches the invention as claimed, including the operating system of claim 1, wherein each of the two or more processes executed by the non-preemptive microkernel has its own stack (col. 3 lines 37-53) (wherein it is well-known that in Unix based systems, each process has its own stack).

13. As per claim 9, Yodaiken teaches the invention as claimed, including the operating system of claim 1, wherein each of the two or more processes executed by the non-preemptive microkernel never terminates (col. 4 line 55 - col. 5 line 2).

14. As per claim 10, Yodaiken teaches the invention as claimed, including the operating system of claim 1, wherein one of the one or more kernels is a microkernel (col. 2 lines 6-16).

15. As per claims 11, 14-15, and 19-20, Yodaiken teaches the invention as claimed, including a method for implementing the operating system of claims 1, 4-5, and 9-10, respectively (col. 3 line 36 - col. 4 line 63).

16. As per claims 21, 24-25, and 29-30, Yodaiken teaches the invention as claimed, including a computer system for implementing the operating system of claims 1, 4-5, and 9-10, respectively (Abstract).

17. As per claim 31, Yodaiken and Beckhoff teach the invention as claimed, including a computer, comprising the operating system of claim 1 (Yodaiken col. 1 lines 8-10; Beckhoff col. 1 lines 10-12). While Yodaiken and Beckhoff do not explicitly recite the elements of the computer, e.g. an interconnect bus, these are well known components of a computer and are within the ideas contemplated by both Yodaiken and Beckhoff.

18. As per claim 33, Beckhoff teaches the invention as claimed, including the computer of claim 31, wherein the non-preemptive microkernel executes a network switch operating system as a dependent process (col. 3 lines 38-48).

19. **Claims 6-8, 16-18, 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yodaiken in view of Beckhoff in view of Mathur et al. (USPN 5,742,825) (hereinafter Mathur).**

20. As per claim 6, Yodaiken fails to teach the operating system of claim 1, wherein each of the two or more processes executed by the non-preemptive microkernel communicate using one or more messages. Mathur teaches this limitation (col. 9 lines 3-25).

21. Yodaiken acknowledges that a communication mechanism is required for maintaining consistency between tasks, but provides a vague description of the preferred method of communication (col. 5 lines 3-17). Yodaiken provides several simple models, while stating that "other approaches...are also possible." (col. 5 lines 15-17). Therefore, it would have been obvious to one of ordinary skill in the art to add Mathur to the combination of Yodaiken and Beckhoff since Mathur provides an exemplary interprocess communication system that is compatible with the teachings of Yodaiken, i.e. using a combination of process identification (col. 19 line 64 - col. 20 line 7) and messaging (col. 9 lines 3-25) by way of UNIX "mailboxes" (col. 9 lines 26-43). Yodaiken allows a process to poll a FIFO ("mailbox") that stores communication data ("messages").

22. As per claim 7, Mathur teaches the invention as claimed, including the operating system of claim 1, wherein each of the two or more processes executed by the non-preemptive microkernel has a unique process identifier [PID] (col. 19 line 64 - col. 20 line 7).

23. As per claim 8, Mathur teaches the invention as claimed, including the operating system of claim 7, further comprising a mailbox coupled to a plurality of processes to service messages sent to a single PID (col. 9 lines 26-43).

24. As per claims 16-18, Yodaiken teaches the invention as claimed, including a method for implementing the operating system of claims 6-8, respectively (col. 3 line 36 - col. 4 line 63).

25. As per claims 26-28, Yodaiken teaches the invention as claimed, including a computer system for implementing the operating system of claims 6-8, respectively (Abstract).

Response to Arguments

26. **Applicant's arguments with respect to claims 1, 4-11, 14-21, 24-31, and 33 have been considered but are moot in view of the new grounds of rejection.**

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
April 5, 2005

MAJID BANANKHAH
PRIMARY EXAMINER